

Appl. No. 09/513,489  
Amdt. dated: DRAFT  
Reply to Office Action of September 23, 2003

Docket No. CISCO-1818  
(032590-000091)

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

### LISTING OF CLAIMS

1. (Currently Amended) A network access server (NAS) providing a user with access and connection to a user in a global data communications internetwork network, said NAS being capable of communicating with a home gateway server (HGS), said NAS comprising:

an IP address requester for requesting an IP address from the HGS on behalf of a user without using a tunneling protocol, the HGS maintaining a pool of IP addresses for allocation to authorized users associated with the NAS;

an IP address relay for receiving an IP address allocated to the user from the HGS and for relaying the allocated IP address to the user; and

a memory coupled with said IP address requester and said IP address relay, said memory storing association between an identification of the user and the IP address allocated to the user.

2. (Previously Presented) The network access server of claim 1, further comprising:

a detector for periodically detecting connection of the user to the NAS, said detector updating the association in said memory to indicate that the allocated IP address is no longer in use if the connection of the user is lost.

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3. (Previously Presented) The network access server of claim 1, further comprising:
- a receiver for receiving periodic queries from the HGS about the status of the user connection to the NAS; and
- a responder responsive to the periodic queries for informing the HGS that the user is still connected to the NAS.
4. (Original) The network access server of claim 1, further comprising:
- a receiver for receiving periodic signals from the user;
- a forwarder responsive to said receiver for forwarding information to the HGS that the user is still connected to the NAS.
5. (Previously Presented) The network access server of claim 1, further comprising:
- an HGS identifier responsive to log-in information provided by the user, said HGS identifier identifying an HGS to which the request for an IP address is to be transmitted.
- 6-8. (Cancelled)
9. (Previously Presented) The network access server of claim 1, further comprising:

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an HGS identifier responsive to call information associated with the incoming line used by the user to access the NAS, the HGS identifier identifying an HGS to which the request for an IP address is to be transmitted.

10-12. (Cancelled)

13. (Original) The network access server of claim 1, further comprising:  
a generator, responsive to the receipt of a disconnection request from the user, for generating and sending a notice to the HGS that the user is no longer connected to the NAS.

14-20. (Cancelled)

21. (Currently Amended) A method for providing an IP address to a user in a data communications network, the method comprising:  
establishing a connection with a user;  
receiving authentication information from the user, the authentication information including a user identification;  
storing the user identification in a memory;  
requesting an IP address from a home gateway server (HGS) on behalf of the user without using a tunneling protocol, the HGS maintaining a pool of IP addresses for allocation to authorized users associated with the NAS;  
receiving an IP address allocated to the user from the HGS;

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creating and storing an association between the user identification and the  
allocated IP address in the memory; ~~and~~  
transmitting the allocated IP address to the user; and  
providing the user with access and connection to a global data communications  
internetwork.

22. (Previously Presented) The method of claim 21, further comprising:  
detecting a continuing connection with the user; and  
sending periodic keep-alive messages associated with the user to the HGS as long  
as the continuing connection with the user is detected.

23. (Previously Presented) The method of claim 21, further comprising:  
receiving periodic queries from the HGS about the status of the user connection;  
and  
responding to the periodic queries that the user is still connected.

24. (Previously Presented) The method of claim 21, further comprising:  
receiving periodic in-use signals from the user; and  
forwarding information to the HGS that the user is still connected.

25. (Previously Presented) The method of claim 24, further comprising:  
determining an HGS to which the request for an IP address to be transmitted.

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26. (Currently Amended) A program storage device readable by a machine, tangibly embodying a program of instructions readable by the machine to perform a method for providing an IP address to a user in a data communications network, the method comprising:

establishing a connection with a user;

receiving authentication information from the user, the authentication information including a user identification;

storing the user identification in a memory;

requesting an IP address from a home gateway server (HGS) on behalf of the user without using a tunneling protocol, the HGS maintaining a pool of IP addresses for allocation to authorized users associated with the NAS;

receiving an IP address allocated to the user from the HGS;

storing an association between the user identification and the allocated IP address in the memory; and

transmitting the allocated IP address to the user; and

providing the user with access and connection to a global data communications internetwork.

27. (Previously Presented) The program storage device of claim 26, wherein the method further comprises:

detecting a continuing connection with the user; and

sending periodic keep-alive messages associated with the user to the HGS as long as the continuing connection with the user is detected.

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28. (Previously Presented) The program storage device of claim 26, wherein the method further comprises:

receiving periodic queries from the HGS about the status of the user connection;

and

responding to the periodic queries that the user is still connected.

29. (Previously Presented) The program storage device of claim 26, wherein the method further comprises:

receiving periodic queries from the HGS about the status of the user connection;

and

responding to the periodic queries that the user is still connected.

30-44. (Cancelled)

45. (Currently Amended) An apparatus for providing an IP address to a user in a data communications network, the apparatus comprising:

means for establishing a connection with a user;

means for receiving authentication information from the user, the authentication information including a user identification;

means for storing the user identification in a memory;

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means for requesting an IP address from a home gateway server (HGS) on behalf of the user without using a tunneling protocol, the HGS maintaining a pool of IP addresses for allocation to authorized users associated with the NAS;

means for receiving an IP address allocated to the user from the HGS;

means for creating and storing an association between the user identification and the allocated IP address in the memory; and

means for transmitting the allocated IP address to the user; and

means for providing the user with access and connection to a global data communications internetwork.

46. (Previously Presented) The apparatus of claim 45, further comprising:  
means for detecting a continuing connection with the user; and  
means for sending periodic keep-alive messages associated with the user to the HGS as long as the continuing connection with the user is detected.

47. (Previously Presented) The apparatus of claim 45, further comprising:  
means for receiving periodic queries from the HGS about the status of the user connection; and  
means for responding to the periodic queries that the user is still connected.

48. (Previously Presented) The apparatus of claim 47, further comprising:  
means for receiving periodic in-use signals from the user; and  
means for forwarding information to the HGS that the user is still connected.

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49. (Previously Presented) The apparatus of claim 47, further comprising:  
means for determining an HGS to which the request for an IP address to be transmitted.
50. (Previously Presented) The network access server in accordance with claim 2, further comprising:  
a keep-alive sender coupled to said detector, said keep-alive sender periodically informing the HGS that the user is still connected to the NAS until the connection is lost.
51. (Previously Presented) The network access server in accordance with claim 1 wherein said IP address requester transmits the user's authentication information to the HGS with the request for an IP address.
52. (Previously Presented) The network access server in accordance with claim 1 wherein said IP address requester uses Remote Authentication Dial In User Service (RADIUS).
53. (Previously Presented) The method in accordance with claim 21 wherein said requesting includes:  
transmitting the user's authentication information to the HGS.

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54. (Previously Presented) The method in accordance with claim 22, further comprising:

updating the association in said memory to indicate that the allocated IP address is no longer in use if the connection is lost.

55. (Previously Presented) The method in accordance with claim 21, further comprising:

receiving a disconnection request from the user; and  
generating and sending a notice to the HGS that the user is no longer connected.

56. (Previously Presented) The method in accordance with claim 25, wherein said determining is in response to log-in information provided by the user.

57. (Previously Presented) The method in accordance with claim 25, wherein said determining is in response to call information associated with an incoming line used by the user.

58. (Previously Presented) The apparatus in accordance with claim 45 wherein said means for requesting includes:

means for transmitting the user's authentication information to the HGS.

59. (Previously Presented) The apparatus in accordance with claim 46, further comprising:

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means for updating the association in said memory to indicate that the allocated IP address is no longer in use if the connection is lost.

60. (Previously Presented) The apparatus in accordance with claim 45, further comprising:

means for receiving a disconnection request from the user; and

means for generating and sending a notice to the HGS that the user is no longer connected.

61. (Previously Presented) The apparatus in accordance with claim 49, wherein said means for determining performs in response to log-in information provided by the user.

62. (Previously Presented) The apparatus in accordance with claim 49, wherein said means for determining performs in response to call information associated with an incoming line used by the user.

63. (Previously Presented) The network access server in accordance with claim 1 wherein said memory stores the association as long as the user maintains the connection with said NAS.

64. (New) The network access server of claim 1, wherein the global data communications internetwork is the Internet.

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65. (New) The method of claim 21, wherein the global data communications internetwork is the Internet.

66. (New) The program storage device of claim 26, wherein the global data communications internetwork is the Internet.

67. (New) The apparatus of claim 45, wherein the global data communications internetwork is the Internet.